Package ‘SurviMChd’

October 12, 2022

**Title**  High Dimensional Survival Data Analysis with Markov Chain Monte Carlo

**Version**  0.1.1

**Date**  2021-05-23

**Depends**  R (>= 3.5.0)

**Imports**  survival, utils, Rdpack (>= 0.7), readr, rjags, R2jags, tidyverse, icenReg, ICBayes, dplyr, rlang

**LazyData**  Yes

**LazyDataCompression**  xz

**ByteCompile**  Yes

**Description**  High dimensional survival data analysis with Markov Chain Monte Carlo (MCMC). Currently support frailty data analysis. Allows for Weibull and Exponential distribution. Includes function for interval censored data.

**License**  GPL-3

**Encoding**  UTF-8

**NeedsCompilation**  no

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**RoxygenNote**  7.1.1.9000

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**Repository**  CRAN

**Date/Publication**  2021-05-23 14:20:02 UTC

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- **fraidm**

  **Frailty with Discrete Mixture Model**

**Description**

Discrete mixture model with MCMC

**Usage**

```r
def fraidm(m, n, Ins, Del, Time, T.min, chn, iter, data)
```

**Arguments**

- `m`: Starting column number form where study variables to be selected.
- `n`: Ending column number till where study variables will get selected.
- `Ins`: Variable name of Institute information.
- `Del`: Variable name containing the event information.
- `Time`: Variable name containing the time information.
- `T.min`: Variable name containing the time of event information.
- `chn`: Number of MCMC chains
- `iter`: Define number of iterations as number.
- `data`: High dimensional data, event information given as (delta=0 if alive, delta=1 if died). If patient is censored then t.min=duration of survival. If patient is died then t.min=0. If patient is died then t=duration of survival. If patient is alive then t=NA.

**Details**

By given `m` and `n`, a total of 3 variables can be selected.

**Value**

- `fraidmout` - `b[1]` is the posterior estimate of the regression coefficient for first covariate.
- `b[2]` is the posterior estimate of the regression coefficient for second covariate.
- `b[3]` is the posterior estimate of the regression coefficient for third covariate.
- `omega[1]` and `omega[2]` are frailty effects.
- `c[1]` and `c[2]` are regression intercept and coefficients of covariates over mean effect.
fraidpm

References


See Also

fraidpm frairand

Examples

```r
## Not run:
##
data(frailty)
fraidpm(m=5,n=7,Ins="institute",Del="del",Time="timevar",T.min="time.min",chn=2,iter=6,data=frailty)
##
## End(Not run)
```

fraidpm

**Frailty with drichlet process mixture**

Description

Frailty analysis on high dimensional data by Drichlet process mixture.

Usage

```r
fraidpm(m, n, Ins, Del, Time, T.min, chn, iter, adapt, data)
```

Arguments

- **m**: Starting column number form where study variables to be selected.
- **n**: Ending column number till where study variables will get selected.
- **Ins**: Variable name of Institute information.
- **Del**: Variable name containing the event information.
- **Time**: Variable name containing the time information.
- **T.min**: Variable name containing the time of event information.
- **chn**: Number of MCMC chains.
- **iter**: Define number of iterations as number.
- **adapt**: Define number of adaptations as number.
- **data**: High dimensional data, event information given as (delta=0 if alive, delta=1 if died). If patient is censored then t.min=duration of survival. If patient is died then t.min=0. If patient is died then t=duration of survival. If patient is alive then t=NA.
Details

By given m and n, a total of 3 variables can be selected.

Value

fraidpmout omeg[i] are frailty effects.

Author(s)

Atanu Bhattacharjee and Akash Pawar

References


See Also

fraidm frairand

Examples

```r
## Not run:
##
data(frailty)
fraidpm(m=5,n=7,Ins="institute",Del="del",Time="timevar",T.min="time.min",chn=2,iter=6,
adapt=100,data=frailty)
##
## End(Not run)
```

frailty

Frailty in high dimensional survival data.

Description

Data set listing institutional wise survival outcomes
Survival observations data for frailty model functions of SurviMChd

Usage

data(frailty)
Format

A tibble with 7 columns and 272 rows which are:

- **institute** Institute of the sample observations
- **del** Numeric values 0 or 1 containing death/event information
- **timevar** Survival duration
- **time.min** Minimum survival
- **female** Covariate_1, gender variable indicating either a female or not
- **ph.karno** Covariate_2
- **pat.karno** Covariate_3

Examples

data(frailty)

---

### frairand

Frailty with random effects in high dimensional data with MCMC

Description

Random effects frailty model

Usage

frairand(m, n, Ins, Del, Time, T.min, chn, iter, adapt, data)

Arguments

- **m** Starting column number form where study variables to be selected.
- **n** Ending column number till where study variables will get selected.
- **Ins** Variable name of Institute information.
- **Del** Variable name containing the event information.
- **Time** Variable name containing the time information.
- **T.min** Variable name containing the time of event information.
- **chn** Number of MCMC chains.
- **iter** Define number of iterations as number.
- **adapt** Define number of adaptations as number.
- **data** High dimensional data having survival duration, event information and column of time for death cases.

Details

By given m and n, a total of 3 variables can be selected.
Value

frairandout omeg[i] are frailty effects.

Author(s)

Atanu Bhattacharjee and Akash Pawar

References


See Also

fraidm fraidpm

Examples

```r
## Not run:
##
data(frairand)
frairand(m=5,n=7,Ins="institute",Del="del",Time="timevar",T.min="time.min",chn=2,iter=6,
adapt=100,data=frairand)
##
## End(Not run)
```

---

**headnneck**

*High dimensional genomic data on head and neck cancer*

Description

Head and neck cancer data *tibble* on head and neck cancer patients for survexpMC and survweibMC functions.

Usage

data(headnneck)

Format

A *tibble* with 13 columns which are:

- **Subjects** Patients referred to as Subjects
- **OS** Overall Survival
- **Death** Death status for the particular subjects
- **randgrp1** Arm of group assigned to subjects
gender1  Demographic information of Subjects, i.e. Gender
Stratum1  Stratum from where the sample is drawn
prevoi  Categorical observation
Covariate_1  Continuous observations
Covariate_2  Continuous observations
Covariate_3  Continuous observations
Covariate_4  Continuous observations
Covariate_5  Continuous observations
Covariate_6  Continuous observations

Examples

data(headnneck)

----------------------
<table>
<thead>
<tr>
<th>hnscc</th>
<th>hnscc Head and neck cancer data</th>
</tr>
</thead>
</table>

Description

High dimensional head and neck cancer gene expression data

Usage

data(hnscc)

Format

A dataframe with 565 rows and 104 variables

ID  ID of subjects
leftcensoring  Initial censoring time
deat  Survival event
os  Duration of overall survival
PFS  Duration of progression free survival
Prog  Progression event
GJB1,...,HMGCS2  High dimensional covariates

Examples

data(hnscc)
mcsurv

*Metronomic cancer data*

**Description**

Observations made tibble on the head and neck cancer patients. Data for survMC function from SurviMChd package.

**Usage**

data(mcsurv)

**Format**

A tibble with 15 columns which are :

- **OS** Overall Survival
- **Death** Death status
- **t** Time at which event occurred
- **x1** Variable measured on continuous scale
- **x2** Variable measured on discrete scale
- **x3** Variable measured on continuous scale
- **x4** Variable measured on discrete scale
- **x5** Variable measured on continuous scale

**Examples**

data(mcsurv)

---

survexpMC

*Exponential survival analysis with MCMC*

**Description**

Survival analysis with exponential distribution by MCMC

**Usage**

survexpMC(m1, n1, m2, n2, chains, iter, data)
survexpMC

Arguments

m1 Starting column number from where variables of high dimensional data will be selected.

n1 Ending column number till where variables of high dimensional data will get selected.

m2 Starting column number from where demographic observations starts

n2 Ending column number of the demographic observations

chains Number of MCMC chains

iter Number of MCMC iterations

data High dimensional data having survival duration as (OS), event information as Death (1 if died, or 0 if alive).

Value

survexpMCoout A data set listing estimated posterior means and deviances

Author(s)

Atanu Bhattacharjee and Akash Pawar

References


See Also

survweibMC

Examples

## Not run:
##
data(headnneck)
survexpMC(m1=8,n1=12,m2=4,n2=7,chains=2,iter=10,data=headnneck)
##
## End(Not run)
survintMC

High dimensional survival analysis with interval censored data by MCMC

Description

Performs survival analysis with MCMC on a data set by computing survival interval given left and right censoring time.

Usage

survintMC(m, n, Leftcensor = NULL, OS, Death, iter, data)

Arguments

m
Starting column number from where variables of high dimensional data will get selected.
n
Ending column number till where variables of high dimensional data will get selected.
Leftcensor
"Variable/column name" containing the left censoring information.
OS
"Variable/column name" containing survival duration event observations.
Death
"Variable/column name" containing the survival event information. i.e. Death
iter
Number of MCMC iterations.
data
High dimensional data containing the Left censoring, Right censoring, Status and DEG observations.

Details

The survival columns of the data should be arranged as follows - Leftcensoring The column containing the left censoring information, must be named as 'Leftcensor'. Rightcensor The column containing the right censoring information, must be named as 'Rightcensor' i.e. OS. Death The column containing the death and alive information, must be names as 'Status'.

Value

survintMCout A table containing HR and CI for respective covariates.

Author(s)

Atanu Bhattacharjee and Akash Pawar

References

survMC

Survival analysis using Cox Proportional Hazards with MCMC.

Description

Performs survival analysis using Cox Proportional Hazards with MCMC.

Usage

survMC(m, n, Time, Event, chains, adapt, iter, data)

Arguments

  m  
  Starting column number from where variables of high dimensional data will get selected.

  n  
  Ending column number till where variables of high dimensional data will get selected.

  Time  
  Variable/Column name containing the information on duration of survival

  Event  
  Variable/Column name containing the information of survival event

  chains  
  Number of chains to perform

  adapt  
  Number of adaptations to perform

  iter  
  Number of iterations to perform

  data  
  High dimensional data having survival duration and event.

Details

The survival columns of the data should be arranged as follows - Death Death status=1 if died otherwise 0. OS Survival duration measured as ‘OS’ t.len Number of censored times

Value

Data set containing Posterior HR estimates, SD and quantiles.
survMCmulti

Survival analysis on multiple variables with MCMC

Description

Performs survival analysis using Cox Proportional Hazards with MCMC with an option to input select multiple variables.

Usage

```r
survMCmulti(
    var1 = NULL,
    var2 = NULL,
    var3 = NULL,
    var4 = NULL,
    var5 = NULL,
    Time,
    Event,
    chains,
    adapt,
    iter,
    data
)
```
survMCmulti

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>var1</td>
<td>Variable name (first one)</td>
</tr>
<tr>
<td>var2</td>
<td>Variable name (second one)</td>
</tr>
<tr>
<td>var3</td>
<td>Variable name (third one)</td>
</tr>
<tr>
<td>var4</td>
<td>Variable name (fourth one)</td>
</tr>
<tr>
<td>var5</td>
<td>Variable name (fifth one)</td>
</tr>
<tr>
<td>Time</td>
<td>Variable/Column name containing the information on duration of survival</td>
</tr>
<tr>
<td>Event</td>
<td>Variable/Column name containing the information of survival event</td>
</tr>
<tr>
<td>chains</td>
<td>Number of chains to perform</td>
</tr>
<tr>
<td>adapt</td>
<td>Number of chains to perform</td>
</tr>
<tr>
<td>iter</td>
<td>Number of iterations to perform</td>
</tr>
<tr>
<td>data</td>
<td>High dimensional data having survival duration and event.</td>
</tr>
</tbody>
</table>

Details

The survival columns of the data should be arranged as follows - Death Death status=1 if died otherwise 0. OS Survival duration measured as 'OS'

Value

Data set containing Posterior HR estimates, SD, quantiles and meandeviance.

Author(s)

Atanu Bhattacharjee and Akash Pawar

References


See Also

survintMC

Examples

```r
## Not run:
##
data(mcsurv)
survMCmulti(var1="x1", var2=NULL, var3="x3", var4="x2",
            var5="x4", Time="OS", Event="Death", chains=2, adapt=100, iter=1000, data=mcsurv)
##
## End(Not run)
```
Description

Survival analysis with weibull distribution by MCMC

Usage

survweibMC(m1, n1, m2, n2, chains, iter, data)

Arguments

m1 Starting column number from where variables of high dimensional data will be selected.
n1 Ending column number till where variables of high dimensional data will get selected.
m2 Starting column number from where demographic observations starts
n2 Ending column number of the demographic observations
chains Number of MCMC chains
iter Number of MCMC iterations
data High dimensional data having survival duration as (OS), event information as Death (1 if died, or 0 if alive).

Value

beta1[1] Posterior estimates of regression coefficients and deviance

Author(s)

Atanu Bhattacharjee and Akash Pawar

References


See Also

survexpMC
Examples

```r
## Not run:
##
data(headnneck)
survweibMC(m1=8,n1=12,m2=4,n2=7,chains=2,iter=10,data=headnneck)
##
## End(Not run)
```
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